Inspiring Women: Dana Dattelbaum

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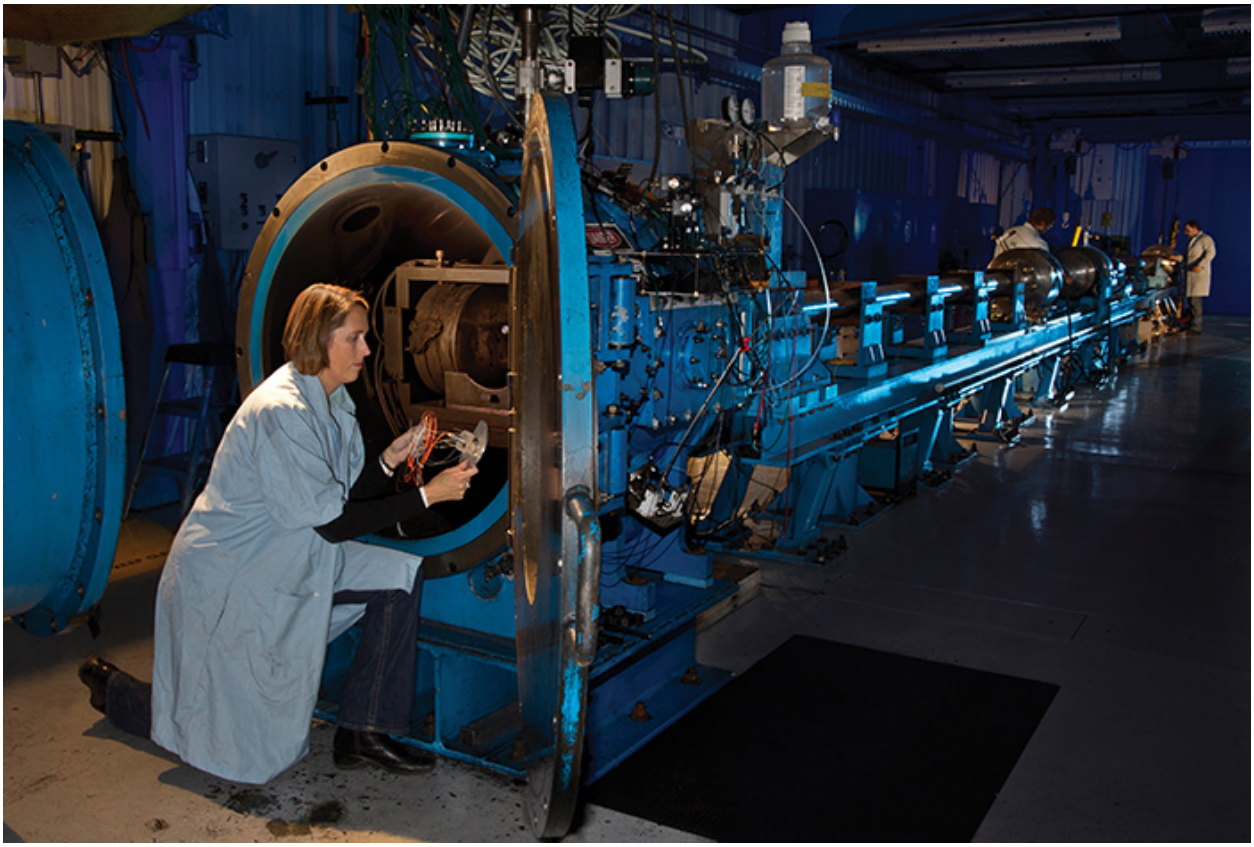

Creatively connecting fundamental science to stockpile stewardship

Dana Dattelbaum's experiments in shock sensitivity and dynamics of explosives support simulations of nuclear weapons performance and enhance the safety of the nation's nuclear stockpile.

She says she was inspired early on to work in her field and to understand that creativity is an essential part of scientific research.

"I was fortunate that my high school was "adopted" by a chemical company, and I was able to start performing hand-on research before entering college, which led to my decision to pursue a degree in Chemistry. Early and consistently throughout my undergraduate education, I was engaged in summer (NSF REU) and semester research

projects, which both solidified course topics, and shaped my creativity as a research scientist."

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Explosives Performance: Supporting Stockpile Stewardship

She uses the Lab’s unique experimental platforms and diagnostics to examine fundamental science issues that affect materials in the stockpile. Gas guns investigate materials properties of explosives at conditions similar to those found in nuclear weapons. The shock waves in the gas guns start chemical reactions in explosives, which eventually lead to detonation.

The best part of her job: best scientists and national capabilities

Dattelbaum's work is fostered by relationships with other researchers at Los Alamos and unique facilities and resources.

She says, "The best part of my job is working with the best scientists and having access to national capabilities for performing research—the teams of people that can be brought together on a project or experiment at the National Laboratories is unmatched."

"And working with a diverse group of scientists with different backgrounds strengthens our diagnostic capabilities, and physical understanding of mechanisms at play in the experiments"

"We also use a number of complex dynamic platforms, such as gas and powder guns, explosive drives, and dynamic diamond anvil cells coupled with optical, electromagetic, and x-ray diagnostics to interrogate shocked material states and phases."

Dattelbaum reports that she is inspired by her contributions, "to national missions for Defense Programs, and delivering data to inform models used in DOE hydrocodes. I get satisfaction knowing that our data is high quality, and will stand over time to support weapons programs’ missions."

Impacting the Lab's Stockpile Stewardship mission

Shock and detonation physics are critical mission-related science themes at the Laboratory, and the results from her work directly impact the Stockpile Stewardship mission. Examples include directly supporting material selection and replacement in Life Extension Programs, and developing improved or new models to describe inert and energetic materials used in the stockpile. More fundamental research results define material behaviors, phase transformation or reactoin mechanisms and their timescales for highly complex, temporally-evolving shock compressed states.

The Lab's unique dynamic platforms and diagnostics often mean that the type of data that is obtained cannot be measured elsewhere.

Dattelbaum develops diagnostics to measure the chemical species as they evolve at very fast reaction rates behind the shock front. This information is used to develop models of the performance of nuclear weapons and to enhance the safety of the stockpile.

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She received a PhD in organic chemistry from the University of North Carolina at Chapel Hill and joined the Laboratory as a Director's Postdoctoral Fellow.

The American Physical Society named her to Fellow based on her pioneering studies of the dynamic properties of materials.

Dattelbaum works for the WX-9 Shock and Detonation Physics group.